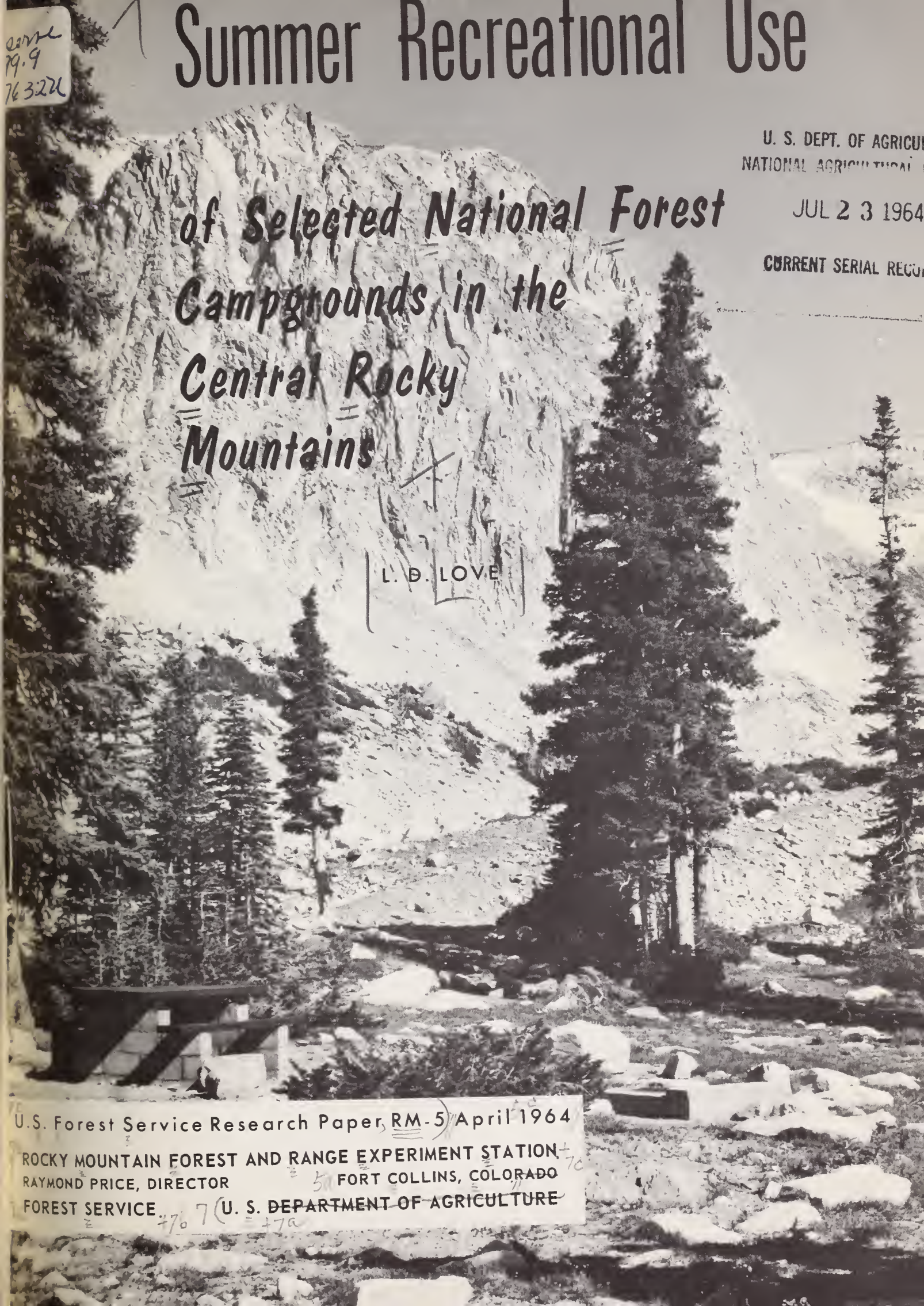


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# Summer Recreational Use

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## of Selected National Forest Campgrounds in the Central Rocky Mountains

L. D. LOVE

U. S. Forest Service Research Paper, RM-5 April 1964

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FOREST SERVICE

U. S. DEPARTMENT OF AGRICULTURE



**ABOUT THE COVER:**

*Timberline vegetation and rugged mountain peaks attract visitors to the Mirror Lake campground in the Snowy Range, Medicine Bow National Forest, Wyoming.*

3  
SUMMER RECREATIONAL USE OF  
SELECTED NATIONAL FOREST CAMPGROUNDS IN  
THE CENTRAL ROCKY MOUNTAINS//

2 by

L. D. Love, Research Forester

Rocky Mountain Forest and Range Experiment Station<sup>1</sup>

<sup>1</sup> Central headquarters maintained in cooperation with Colorado State University at Fort Collins.



# Summer Recreational Use of

## Selected National Forest Campgrounds

### in the Central Rocky Mountains

by

L. D. Love

#### SUMMARY

From mid-June to mid-September 1962, 12 selected campgrounds were observed in the National Forests of Arizona, New Mexico, Colorado, Wyoming, and South Dakota. The purpose of the study was to establish patterns of recreational use in order to guide future development and management.

Highlights are:

1. In-State parties visiting the 12 campgrounds were more numerous than out-State. Camping parties slightly outnumbered day-use parties.
2. About 10 percent of the total vehicles were campers (pickup with camper-back or other sleep-in vehicle). The use of tents for camping exceeded travel trailers by a ratio of 1.5 to 1. The average number of visitors per party (4.8) was greater than the average number of visitors per vehicle (3.9) because frequently two or more vehicles were used by a single party. Camping visitors per party and per vehicle were less than day-use visitors per party and vehicle.
3. The young adult (21-39 years) and children (13 years or less) were the dominant visi-

tors. Next in importance was the middle-aged adult (40-59 years) followed by the teenager (14-20 years). The older adult (60+ years) was the most infrequent visitor.

4. Most visitor-hour use was attributed to camping. In general, about 10 percent of the total visitor-hour use was the result of day-use.
5. People who camped stayed an average of 27.35 hours per visitor. Day-users stayed an average of 2.35 hours per visitor.
6. Family units were not used uniformly. Day-use of all units averaged less than 6 hours per visitor per day. Unit use varied as follows:

Daily use per camping visitor	Units used	
	(Hours)	(Number) (Percent)
0-6	308	60
7-12	123	24
13-18	33	6
19-24	50	10
Total	514	100

7. In general, the average daily use per visitor at each family unit for both camping

and day-use was 6 hours the first period (mid-June to end of July) and 7 hours the second (August to mid-September). When contrasted to the possible total daily use, units were actually in use about 27 percent of the time.

8. Total hours of daily use per visitor at each family unit appeared to be associated with the distance certain facilities are from the units as follows:
  - a. Units between 50 and 200 feet from toilets were used more than those within 50 feet or over 200 feet.
  - b. Units within 150 feet of drinking water were used more than those over 150 feet.
  - c. Units over 100 feet apart were used more than those closer together.
  - d. Units between 50 and 200 feet from a fishing point were used more than those within 50 feet or over 200 feet.
  - e. Units with a clearing of over 10 feet in radius from the fire grate were used more than those with less.
9. In the first period, 17 percent of the total family units (514) were never used; 29 percent were never used in the second period. Thus, the number of parties visiting the campgrounds could have been accommodated by about 20 percent fewer family units. A limited number of family units were selected by several new parties (a measure of popularity); for example in the first period, 10 percent of the total family units (514) were selected 5 or more times; this percentage was about the same (11 percent) during the second period.

## INTRODUCTION

Quantitative information concerning recreational use of National Forest campgrounds is desirable not only to relate recreation to other forest uses, but also for the development, maintenance, and rehabilitation of forest campgrounds. The number and characteristics of recreationists, purpose and duration of visits, camping equipment used, and the occupancy of family units (table, fire grate, trash container in a localized spot

within a forest campground) are important considerations.

Accordingly, the use of 12 selected campgrounds in the National Forests of Arizona, New Mexico, Colorado, Wyoming, and South Dakota was systematically observed during two 4-day periods between mid-June and mid-September, 1962. The purpose of the study was to establish patterns of recreational use in order to guide development and management of such use and to identify key observations for subsequent studies.

The results of this study provide considerable information about visitors to the 12 campgrounds. Although these results cannot now be applied directly to other campgrounds, particularly those where fees are charged, the fact that some of the observations are nearly identical on all campgrounds may indicate widespread uniformity in visitor use-patterns. If future studies show additional uniformity, it should be possible to predict visitor-use patterns from the trends found in origin of visitors, age classes, length of stay, and factors associated with the selection and use of family units.

## PREVIOUS WORK

Investigations by others dealing with outdoor recreationists have been conducted for a variety of purposes. Methods employed likewise have varied so that it is difficult to make direct comparisons with the results obtained from the present study. Certain general trends are apparent, but specific supporting evidence is lacking.

In a study of the economic value of State parks in Oregon (Ore. State Highway Dept., 1959),<sup>2</sup> it was found that 87 percent of the total visits to State parks were by in-State residents, that the average number of persons per party was 5.03, and that the average length of stay within 25 miles of parks was 2.2 days per party. This is equivalent, on the average, to 52.8 hours for a party of 5.03 persons, or 10.5 hours per visitor.

<sup>2</sup> Names and dates in parentheses refer to *Literature Cited*, p. 22.



Burke<sup>3</sup> found, in his studies of the utilization of recreation areas, that people select and use tables in relation to distance from parking; the closer the parking the more frequent the selection and use. The trend was similar for distance from a beach. The basal area of trees within 30 feet of a table influenced the choice and use of tables; tables with trees of lower basal areas were chosen more often and used for longer periods of time. He also found that certain camp sites were preferred and used longer than others.

Hutchins and Trecker (1961), in their study of the visitors to Wisconsin State parks, found that the passenger load per car was 3.5 persons and that two-thirds of the visitors were in-State residents. Eighty percent of the visitors stayed for a day or less.

According to ORRRC (U.S. Outdoor Recreation Resources Review Commission, 1962a), single-family groups with or without children play a dominant role in areas where camping (74.5 percent) and sightseeing (66.6 percent) are major attractions. About 40 percent of the user groups included boys or girls or both 12 years of age or less, and about 23 percent included teenagers. Sixty-four percent of the user groups included one or more men between 20 and 44 years, and 65 percent included women in the 20 to 44 age bracket. About a third of the visitors to National Forests stayed between 1 and 3 days, while about half of them spent less than one-half day. About three-fourths of the groups that camped stayed for a day or more.

In another ORRRC report (1962b), it was noted that only minor male-female differences exist, especially where families or mixed groups can participate in outdoor recreation. Participation in outdoor recreation tends to decline as the age group reaches 45 to 54. Greater participation is noted in the age groups 18 to 24 and 24 to 34.

Ripley (1962), in his study of recreation impact on campgrounds and picnic sites,

<sup>3</sup> Burke, Hubert D. *Mapping of utilization on recreation areas*. 1961. (First and second office reports on exploratory phase of the study, on file at Northeast. Forest Expt. Sta., U. S. Forest Serv., Upper Darby, Pa.)

points out that table spacing is a minor factor because use is closely confined to the table. He noted that distance to the nearest parking area controls use, and that parking facilities could be used to foster more uniform use.

Among canoe country vacationers described by Taves, et al. (1960) a greater percentage (76 percent) of visitors who camp were in age groups 25 to 54 than in other groups. Also, about 40 percent of the campers were women.

Tocher and Kearns (1962) in their description of Utah tourism point out that travel trailers and campers (pickup with camper-back) comprise about 10 percent of the camping equipment used at public camps. They predict that the use of this kind of equipment will increase.

In discussing age of people who camp, Wagar<sup>4</sup> found that over half of the visitors asked were between 15 and 39 years. He also found that a high percentage of females participate in outdoor recreation activities.

The results of the present study are reasonably well substantiated by results obtained elsewhere. This is apparent with regard to proportion of in-State to out-State visitors, age classes, sex ratios, and influence of distance to parking areas on unit use. The results obtained elsewhere apply to a lesser extent to length of stay, influence of size of clearing on unit occupancy, and kinds of equipment used by outdoor recreationists.

## CAMPGROUNDS STUDIED

Campgrounds representing different elevational and vegetational zones were chosen for study (table 1). The campgrounds provided both camping and day-use. Some provided additional activities, such as fishing, boating, and hiking so that the users had a variety of choices.

<sup>4</sup> Wagar, J. Alan. *An exploratory study of visitor motivation and attitudes toward forest recreation*. 1962. (Office report on file at Northeast. Forest Expt. Sta., U. S. Forest Serv., Upper Darby, Pa.)

Table 1. --Description of 12 campgrounds observed in four States from mid-June to mid-September 1962

Campground and National Forest	Elevation	Vegetation type	First observation period (mid-June to end of July)		Second observation period (August to mid-September)	
			Dates	Weather	Dates	Weather
Feet						
ARIZONA:						
Rose Canyon (Coronado)	7,200	Ponderosa pine	July 20-23	Clear, warm	Aug. 31- Sept. 3 (Labor Day)	Clear, warm
Lakeside (Sitgreaves)	6,700	Ponderosa pine	July 6-9	Clear, warm	Aug. 17-20	Clear, warm
Ashurst (Coconino)	7,000	Mixed ponderosa pine and juniper	June 22-25	Clear, warm, windy	Aug. 3-6	Clear, warm, windy
NEW MEXICO:						
Fourth of July (Cibola)	8,000	Ponderosa pine- Gambel oak- bigtooth maple	July 27-30	Clear, warm; turned cloudy and stormy on July 30	Sept. 7-10	Clear, warm
Holy Ghost (Santa Fe)	8,000	Mixed conifers	June 29- July 2	Partly cloudy, warm; heavy thunderstorm on June 29, followed by clearing weather	Aug. 10-13	Partly cloudy, warm
La Sombra- Capulin (Carson)	7,800	Canyon-bottom	July 13-16	Clear, warm	Aug. 24-27	Clear, warm
COLORADO:						
Maroon Lake (White River)	10,000	Aspen predominates	July 13-16	Clear to partly cloudy; warm days; cool evenings; intermittent rain showers	Aug. 17-20	Clear to partly cloudy; warm days; cool evenings; intermittent rain showers that lasted longer than first period (Sat. & Sun.)
Echo Lake (Arapaho)	10,700	Engelmann spruce- subalpine fir- bristlecone pine	June 29- July 2	Partly cloudy, cool; hail and rainstorm on July 1	Aug. 10-13	Partly cloudy, cool; considerable wind
Walton Creek (Routt)	9,000	Engelmann spruce- subalpine fir	July 20-23	Clear; warm days; cold evenings	Aug. 31- Sept. 3 (Labor Day)	Clear; cold; dusty; cloudy and windy on Sept. 3
Chambers Lake (Roosevelt)	9,200	Lodgepole pine	June 22-25	Partly cloudy, warm days; cool evenings; intermittent rain showers	Aug. 3-6	Partly cloudy; warm days; cool evenings; intermittent rain showers
WYOMING:						
Mirror Lake (Medicine Bow)	10,500	Engelmann spruce- subalpine fir	July 6-9	Partly cloudy, cool, turn- ing cloudy and cold on July 9	Aug. 24-27	Clear; windy; cool
SOUTH DAKOTA:						
Sheridan Point (Black Hills)	7,000	Ponderosa pine	July 27-30	Partly cloudy, warm; prolonged rainstorm on July 28	Sept. 7-10	Partly cloudy, cool; brief snowstorm on Sept. 8, turning warm on Sept. 10



Family units	Location	Supplemental information
Number		
85	20 miles northeast of Tucson	On the Mt. Lemmon highway; small artificial lake at west end provides limited fishing opportunities; improved gravel access roads are narrow and rough in several places; family units divided into 4 broad groups: 2 for group participation under special-use permit, day-use only (fig. 1); 7, day-use only; 12, travel-trailer use; 64, camping and day-use.
51	6 miles south of Show Low	Artificial lake nearby provides fishing opportunities; recreation guard visited campground daily, seasonlong; some recent rehabilitation through "Operation Outdoors" program; gravel access roads adequate for moving traffic, which often created palls of drifting dust throughout campground; family units divided into 3 broad groups: 5, day-use only; 19, travel-trailer use; remainder, camping and day-use.
50	25 miles southeast of Flagstaff	On east and west banks of Ashurst Lake, an improved natural impoundment; 1962 season was initial period of use for 32 units constructed along east side of lake under "Operation Outdoors" program; access road along west side of lake adequate for moving traffic, remainder of road under partial construction but passable; all family units, camping and day-use; 3 toilets serviced the area, others under construction.
26	40 miles southeast of Albuquerque	No special attraction at campground, but variety of trees affords pleasant surroundings; in 1960-61, old area rehabilitated and new units added under "Operation Outdoors" program; 1962 was second season of use of enlarged area; recreation guard visited campground daily, seasonlong; all family units, camping and day-use; improved gravel road narrow--in places parked vehicles interfere with moving traffic.
22	15 miles northwest of Pecos	In headwater area of Pecos River, along Holy Ghost Creek, a tributary to the river; only moderate maintenance since construction in CCC days; recreation-guard visits averaged every other day; all family units, camping and day-use -- 6 were Appalachian shelters (fig. 2); improved dirt access road is rutted and rocky in spots, ford creek in two substandard places; undeveloped spring at north end of campground provides very limited source of drinking water.
17	8 miles southeast of Taos	On U. S. Highway 64; a combination of two campgrounds with a connecting road; adjacent to Taos Creek; all family units, camping and day-use; was developed during CCC days, with little maintenance and no rehabilitation since; undeveloped spring provides limited supply of drinking water; three entrances from the highway, with interior dusty, dirt roads; access road was extremely dusty in August period; recreation-guard visits averaged every other day.
61	11 miles southwest of Aspen	In headwater area of Maroon Creek; campground is 300 feet north of Maroon Lake; trails lead into Maroon Bells-Snowmass Wild Area; in 1960-61, campground rehabilitated and new units added under "Operation Outdoors" program; 1962 was initial season of use of enlarged area; recreation guard visited campground daily, seasonlong; family units divided into 2 broad groups: 16, trailer use only; 11, day-use only; remainder, camping and day-use.
19	20 miles southwest of Idaho Springs	On Mount Evans road (Colorado Highway 103); last campground before road ascends Mt. Evans; on loop drive from Denver; 1/4 mile to Echo Lake which provides moderate fishing opportunities; established in CCC days, has had moderate maintenance; group shelter (fig. 3) is attractive, popular improvement that accommodates several unrelated parties at one time; has one council circle; all but 2 of 19 family units designated camping and day-use; recreation guard visited campground daily, seasonlong; gravel access road too narrow for 2-way traffic; congestion resulted at limited parking areas.
14	12 miles east of Steamboat Springs	Visible from U.S. Highway 40; Walton Creek, adjacent to site, provides some fishing opportunities; in 1960-61, old area rehabilitated and new units added under "Operation Outdoors" program; 1962 was second season of use for enlarged area; recreation guards visited periodically during season; all units, camping and day-use; dirt access road adequate for moving traffic; little congestion occurred.
55	60 miles west of Fort Collins	In headwater area of Cache la Poudre River, along southwest shore of Chambers Lake; recreationists travel to Chambers Lake--an artificial impoundment for water supply--for fishing and boating opportunities; in 1960-61, old area rehabilitated, new units added under "Operation Outdoors" program; 1962 was initial use period of enlarged area; recreation guard stationed at campground, seasonlong; improved gravel access road adequate for moving traffic, but some congestion in terminal parking lot; family units divided into 2 broad groups: 21, trailer use only; remaining units, camping and day-use, with 6 for day-use only.
19	30 miles west of Laramie	In Snowy Range, adjoining Mirror Lake--an improved natural lake--that provides considerable shore fishing; snowdrifts blocked entrance on July 6, but were opened by noon that day; campground extremely wet due to rapid snowmelt--several cars of first group of visitors became stuck in mud; scenic setting is site's major attraction (see cover photo); recreation guards visited periodically; some rehabilitation work under "Operation Outdoors" program had been completed; additional rehabilitation was begun late in 1962 season.
96	5 miles north of Hill City	Along U. S. Highway 85A, adjacent to Sheridan Lake where boating, fishing, water skiing, and swimming are main attractions (fig. 4); recreation guard stationed at area, seasonlong; movies were shown every other evening during first period; new units had been added to campground in 1961 with more under construction in 1962; study included the 96 available during 1962; family units were divided into two groups: 66 units, tent camping; 30 units, trailer use; 1962 was initial period of use for 25 units; access road to 25 new units often muddy and slick; remainder of road adequately accommodated moving traffic; little congestion occurred.





Figure 1.--  
Group-participation unit at  
Rose Canyon campground for  
day-use under special-use  
permit. Coronado National  
Forest, Arizona.

Figure 2.--  
Appalachian shelters are  
an attraction at the Holy  
Ghost campground. Santa  
Fe National Forest, New  
Mexico.



Figure 3.--  
This popular group shelter  
lends attractiveness to  
the Echo Lake campground.  
Arapaho National Forest,  
Colorado.



## PROCEDURES

All campgrounds were observed twice during the summer. Each observation period covered 4 days--a Friday-through-Monday period. The number of observations at each campground depended upon the number of family units. Use of each unit was recorded hourly--8 a.m. to 7 p.m. (except on Mondays when the last record was made at 5 p.m.). The goal was to arrive at a census of the total use of a campground during the periods of observation.

Observations at the family units included: kind and amount of camping equipment used; size of party; age and sex classes; length of stay; and apparent activity. Data were summarized as to campground facilities available, distance from parking areas and other improvements, vegetation and soil conditions, and points of interest.

### Field Methods

Field methods consisted of: sketch maps of the campgrounds, inventory of units, and daily-use records.

Mapping.--A sketch map was drawn to show access and spur roads, and location of units, toilets, water outlets, parking areas, community shelters, fire circles, and other developments considered a part of the camp-

ground. The map was used to number and locate units to be observed and to show the relative placement of other facilities.

Unit Inventory.--An inventory describing the units was made during the first visit to the campground (fig. 5). It summarized conditions found with regard to shade, screening, ground cover, drainage, slope, erosion, and distances to various improvements. Size of clearing at each unit was indicated by measuring the maximum distance from the fire grate to the edge of the disturbed area caused by trampling or other activities that tended to alter or destroy the ground cover.

Daily Use Record.--Use of each unit was continuously recorded throughout the periods of observation (fig. 6). The record included the times of use and nonuse, number, age and sex of users, equipment used by visitors, apparent activities of users, and the State from which they came (from auto license plates). Summaries of the records provided a pattern of use for the campground as a whole, either daily or for the total period.

During the latter part of May 1962, two of the campgrounds were observed to test procedures. An analysis of the information obtained indicated that the procedures were adequate to achieve the objectives of the study. Recording use was difficult only during the peak hours of the day. At those times observations were recorded every other hour.

Figure 4.--

*Boating, fishing, water skiing, and swimming at Sheridan Lake are main attractions for visitors using the Sheridan Point campground near Hill City, South Dakota, in the Black Hills National Forest. Nearby is the Mount Rushmore National Memorial.*



Elevation \_\_\_\_\_  
Vegetation Zone \_\_\_\_\_

Unit No. \_\_\_\_\_  
Observer \_\_\_\_\_  
Date \_\_\_\_\_

UNIT INVENTORY

Recreation Site \_\_\_\_\_  
(Name and Number)

Type of Unit \_\_\_\_\_  
(Camping, Trailer, Etc.)

Insolation at Unit

Shade present from 10 a.m. to 3 p.m.: Yes \_\_\_\_\_ No \_\_\_\_\_  
If "Yes" show: Full \_\_\_\_\_ or Partial \_\_\_\_\_  
Canopy: Under 10 ft. \_\_\_\_\_ 10-30 ft. \_\_\_\_\_ Over 30 ft. \_\_\_\_\_  
Timber Type: Coniferous \_\_\_\_\_ Deciduous \_\_\_\_\_ Species \_\_\_\_\_  
Screened from adjacent unit: Yes \_\_\_\_\_ No \_\_\_\_\_

Ground Condition at Unit

Soil Surface: Stony \_\_\_\_\_ Sandy \_\_\_\_\_ Clay-Silt \_\_\_\_\_  
Ground Cover: Grass \_\_\_\_\_ Weed \_\_\_\_\_ Shrub \_\_\_\_\_ Litter \_\_\_\_\_ Bare \_\_\_\_\_ Eroded \_\_\_\_\_  
Surface Drainage: Good \_\_\_\_\_ Fair \_\_\_\_\_ Poor \_\_\_\_\_  
Surface Slope: Level \_\_\_\_\_ 0-5% \_\_\_\_\_ 6-10% \_\_\_\_\_ 10%+ \_\_\_\_\_  
Reinforcement: None \_\_\_\_\_ Concrete \_\_\_\_\_ Macadam \_\_\_\_\_ Gravel \_\_\_\_\_  
Sand \_\_\_\_\_ Wood chips \_\_\_\_\_ Other \_\_\_\_\_  
Maximum radius of disturbance \_\_\_\_\_ feet

Ground Condition Between Units

Canopy: Open \_\_\_\_\_ Dense \_\_\_\_\_  
Soil Surface: Stony \_\_\_\_\_ Sandy \_\_\_\_\_ Clay-Silt \_\_\_\_\_  
Ground Cover: Grass \_\_\_\_\_ Weed \_\_\_\_\_ Shrub \_\_\_\_\_ Litter \_\_\_\_\_ Bare \_\_\_\_\_ Eroded \_\_\_\_\_  
Surface Drainage: Good \_\_\_\_\_ Fair \_\_\_\_\_ Poor \_\_\_\_\_  
Surface Slope: Level \_\_\_\_\_ 0-5% \_\_\_\_\_ 6-10% \_\_\_\_\_ 10%+ \_\_\_\_\_

Facilities From Unit

Distance: Feet	0-50	50-100	100-150	150-200	200+
Closest parking area					
Toilet (men)					
Toilet (women)					
Garbage disposal					
Drinking water					
Closest-like facility					
Boat dock					
Fishing point					
Viewpoint					
Stream					
Trail					

Additional Characteristics

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Figure 5.--Form used to inventory each family unit during observer's first visit to each campground.





## Evaluation of Data

The initial compilation contained a summary of the daily use for each campground. These summaries provided information as to who used the campground, how long, camping equipment used, in- and out-State residents, and apparent activity. Individual campground summaries were combined to show the variation in origin, age classes, duration of stay, camping equipment used, and unit use. The intensity of use of units (indicated by their continuous occupancy) was related to distance from toilets, water outlets, closest unit, and nearest fishing point (from unit inventory).

Because the majority of the visitors combine activities, they were grouped under two major categories: camping and day-use. Camping involved overnight use, and might or might not include fishing, hiking, and other activities. Day-use involved no overnight use, and included picnicking, fishing, hiking, and general enjoyment, in combination or singly.

The number of parties as well as the total visitors in a party varied from unit to unit and from campground to campground. Accordingly, an item of measurement was devised to indicate the intensity of use for each unit. This was termed "average hours of daily use per visitor" and was calculated as follows:

For camping, the time involved during an observational period was 81 hours, or 3.4 24-hour days. For each unit used for camping, the period total visitor hours was divided by the total number of visitors. This resulted in the average hours each visitor stayed when camping. The average hours per visitor was divided by 3.4 to obtain the average hours of daily use per visitor.

For day-use, the time involved during an observational period was 46 daylight hours or 3.8 12-hour days. For each unit used for day-use, the period total visitor hours was divided by the total number of visitors, yielding the average hours each day-use visitor stayed. The average hours per visitor was divided by 3.8 to obtain the average hours of daily use per visitor.

The average hours of daily use per visitor for camping and day-use were totaled to give a span of unit use of from 0 to 24 hours. Thus, a unit with an index of 24 hours (actually 23.8 hours due to rounding numbers) would be considered continually occupied and receiving a high intensity of use.

For each campground, the average hours of daily use per visitor per unit was determined by totaling the average hours of daily use per visitor at each family unit and dividing by the number of units.

The Chi-square test (Snedecor, 1956) was employed to evaluate the preference of visitors for camping units as related to distances of units from parking areas, toilets, water outlets, fishing points, and closest unit, and to the size of clearing at the units. The results are only suggestive since computation of hypothetical frequencies based on numbers of units in each category leaves much to be desired. Consequently, the outcome of any statistical test may be solely a reflection of campground construction or layout and not of visitor preference.

## RESULTS

The results of the study are combined into two periods. The first period includes the observations made from mid-June to the end of July; the second period, those made from the first of August to mid-September.

For comparative purposes the results are presented according to origin of visitors, camping equipment used, age classes, length of stay, and unit use. Where appropriate, reference is made to the implications of Chi-square tests as a means of isolating some of the factors associated with recreational use.

### Origin of Visitors

A summary of the origin of parties by family units during two 4-day periods (table 2,a) reveals that in-State parties visiting the 12 campgrounds were more numerous than out-State.



Table 2. --Recorded use of 12 campgrounds in 5 States for two 4-day periods, 1962

Recorded use of campground	Arizona			New Mexico			Colorado				Wyo- ming	South Dakota	Total or average
	Rose Can- yon	Lake- side	Ashurst	Fourth of July	Holy Ghost	La Sombra- Capulin	Maroon Lake	Echo Lake	Walton Creek	Cham- bers Lake	Mirror Lake	Sheri- dan Point	
FAMILY UNITS (No.)	1 85	51	50	26	22	17	61	19	14	55	19	96	514
ORIGIN OF PARTIES (No.):													
First period--													
Camping <sup>2</sup>													
In-State	59	75	43	1	16	6	53	10	11	47	2	42	365
Out-State	8	26	2	0	10	11	45	10	40	9	2	124	287
Day-use <sup>3</sup>													
In-State	134	22	34	20	19	31	43	50	25	67	22	11	478
Out-State	14	5	0	0	2	25	17	13	41	9	6	5	137
Total	215	128	79	21	47	73	158	83	117	132	32	182	1,267
Second period--													
Camping <sup>2</sup>													
In-State	109	67	35	0	15	3	54	19	12	75	1	16	406
Out-State	10	17	2	1	29	24	57	16	10	25	10	18	219
Day-use <sup>3</sup>													
In-State	145	22	22	2	18	22	34	49	24	55	22	4	419
Out-State	13	3	2	1	6	16	10	20	25	8	16	1	121
Total	277	109	61	4	68	65	155	104	71	163	49	39	1,165
CAMPING EQUIPMENT USED (No.):													
First period--													
Cars	291	125	86	27	60	87	182	89	110	118	36	184	1,395
Campers	11	22	13	1	4	2	10	3	12	33	0	15	126
Travel trailers	15	53	14	0	13	7	33	4	24	13	0	107	283
Boat trailers	0	3	13	0	0	0	0	0	0	9	0	8	33
Tents	43	45	21	1	25	7	61	5	17	38	5	64	332
Bedrolls <sup>4</sup>	44	7	3	0	2	22	3	0	2	6	0	0	89
Second period--													
Cars	405	107	72	4	73	81	158	115	79	162	50	21	1,327
Campers	18	20	15	0	7	6	19	6	7	25	3	8	134
Travel trailers	34	38	14	0	18	10	16	5	10	36	4	25	210
Boat trailers	0	1	11	0	0	0	0	1	0	9	0	6	28
Tents	85	39	20	1	36	10	95	25	7	63	2	5	388
Bedrolls <sup>4</sup>	64	0	12	0	7	3	20	0	0	6	0	0	112
VEHICLES (No.):													
First period--													
Vehicles	302	147	99	28	64	89	192	92	122	151	36	199	1,521
Vehicles per unit (average)	3.6	2.9	2.0	1.1	2.9	5.2	3.1	4.8	8.7	2.7	1.9	2.1	3.0
Second period--													
Vehicles	423	127	87	4	80	87	177	121	86	187	53	29	1,461
Vehicles per unit (average)	5.0	2.5	1.7	0.2	3.6	5.1	2.9	6.4	6.1	3.4	2.8	0.3	2.8
VISITORS PER PARTY (Average No.):													
First period--													
Camping <sup>2</sup>	5.8	3.8	3.3	6.0	5.8	4.8	4.4	4.3	4.0	4.1	3.5	4.6	4.5
Day-use <sup>3</sup>	6.1	4.5	4.3	7.0	6.5	6.4	4.2	5.1	4.2	5.0	5.1	4.5	5.2
Total	6.0	4.0	3.7	6.9	6.1	6.0	4.3	4.9	4.1	4.6	4.9	4.6	5.0
Second period--													
Camping <sup>2</sup>	6.7	3.8	4.3	5.0	5.8	4.0	4.6	5.6	3.7	4.3	3.7	2.5	4.5
Day-use <sup>3</sup>	6.1	4.0	5.5	5.0	4.6	6.4	3.7	6.0	4.3	4.5	4.9	2.8	4.8
Total	6.4	3.9	4.8	5.0	5.4	5.4	4.3	5.9	4.1	4.4	4.7	2.6	4.7

<sup>1</sup> Only 84 units in compiled data; records incomplete for one unit.<sup>2</sup> Overnight use; may or may not include fishing, hiking, and other activities.<sup>3</sup> No overnight use; includes picnicking, fishing, general enjoyment, hiking, in combination or singly.<sup>4</sup> Without other cover.



Table 2. --Recorded use of 12 campgrounds in 5 States for two 4-day periods, 1962 (continued)

Recorded use of campground	Arizona			New Mexico			Colorado				Wyo- ming	South Dakota	Total or averag
	Rose Can- yon	Lake- side	Ashurst	Fourth of July	Holy Ghost	La Sombra- Capulin	Maroon Lake	Echo Lake	Walton Creek	Cham- bers Lake	Mirror Lake	Sheri- dan Point	
VISITORS PER VEHICLE (Average No.):													
First period--													
Camping <sup>2</sup>	3.8	3.3	2.8	6.0	4.1	3.8	3.7	3.8	3.7	3.4	3.5	4.0	
Day-use <sup>3</sup>	4.3	3.7	3.2	5.2	4.5	5.1	4.0	4.3	4.1	4.4	4.1	3.5	
Total	4.1	3.4	3.0	5.2	4.3	4.8	3.8	4.2	3.9	3.9	4.1	3.9	
Second period--													
Camping <sup>2</sup>	4.0	3.0	3.3	5.0	4.5	3.1	3.6	4.3	3.3	3.7	3.4	2.4	
Day-use <sup>3</sup>	4.2	4.2	3.2	5.0	4.4	4.7	3.6	4.9	3.4	3.7	4.6	2.8	
Total	4.1	3.3	3.3	5.0	4.5	4.1	3.6	4.7	3.4	3.7	4.3	2.5	
AGE CLASSES, CAMPING VISITORS (No.):													
First period--													
13 yrs. or less	146	118	30	4	58	33	147	29	67	71	6	303	1,012
14-20 yrs.	48	26	8	0	6	5	36	6	22	22	0	67	246
21-39 yrs.	115	90	41	2	50	31	147	28	53	90	4	197	848
40-59 yrs.	55	112	54	0	24	12	74	18	45	24	4	140	562
60+ yrs.	1	31	16	0	2	0	11	0	10	19	0	18	108
Total	365	377	149	6	140	81	415	81	197	226	14	725	2,776
Second period--													
13 yrs. or less	305	94	46	2	115	29	177	66	33	133	8	12	1,020
14-20 yrs.	53	23	9	1	18	11	31	27	3	53	6	0	235
21-39 yrs.	255	67	55	2	89	30	183	56	33	148	12	12	942
40-59 yrs.	165	116	43	0	33	33	79	24	10	73	14	26	616
60+ yrs.	3	14	6	0	0	0	10	1	3	15	1	8	61
Total	781	314	159	5	255	103	480	174	82	422	41	58	2,874
AGE CLASSES, DAY-USERS (No.):													
First period--													
13 yrs. or less	252	43	44	64	62	126	59	88	92	90	31	25	976
14-20 yrs.	100	3	8	7	14	34	<sup>5</sup> 144	30	39	29	23	1	432
21-39 yrs.	379	39	51	44	43	121	77	131	63	178	39	29	1,194
40-59 yrs.	141	34	40	25	17	57	66	53	69	63	30	8	603
60+ yrs.	12	2	4	0	0	9	31	7	18	8	10	0	101
Total	884	121	147	140	136	347	377	309	281	368	133	63	3,306
Second period--													
13 yrs. or less	641	32	42	9	35	107	40	124	52	66	55	5	1,208
14-20 yrs.	119	7	13	0	10	19	16	30	30	16	18	1	279
21-39 yrs.	631	30	43	6	42	88	55	150	47	104	61	4	1,261
40-59 yrs.	330	31	19	0	18	40	34	72	64	72	33	4	717
60+ yrs.	11	1	10	0	1	1	11	25	18	19	21	0	118
Total	1,732	101	127	15	106	255	156	401	211	277	188	14	3,583
AVERAGE DAILY USE PER UNIT (Visitor hours):													
First period--													
Camping <sup>2</sup>	33	70	31	2	62	30	54	22	56	27	10	72	39
Day-use <sup>3</sup>	10	1	3	4	5	11	3	8	7	4	5	0.5	5
Total	43	71	34	6	67	41	57	30	63	31	15	72	44
Second period--													
Camping <sup>2</sup>	93	67	30	1	107	41	71	70	27	58	14	5	49
Day-use <sup>3</sup>	11	1	1	0.2	3	10	1	10	7	3	6	0.1	4
Total	104	68	31	1	110	51	72	80	34	61	20	5	53

<sup>5</sup>Includes a music group of 130 from Aspen, Colorado.

Table 2. --Recorded use of 12 campgrounds in 5 States for two 4-day periods, 1962 (continued)

Recorded use of campground	Arizona			New Mexico			Colorado				Wyo- ming	South Dakota	Total or average
	Rose Can- yon	Lake- side	Ashurst	Fourth of July	Holy Ghost	La Sombra- Capulin	Maroon Lake	Echo Lake	Walton Creek	Cham- bers Lake	Mirror Lake	Sheri- dan Point	
AVERAGE LENGTH OF STAY PER VISITOR (Hours):													
First period--													
Camping <sup>2</sup>	25.8	32.3	35.3	23.0	32.9	21.7	27.1	17.8	13.4	22.4	44.6	32.2	27.4
Day <sup>3</sup>	3.6	2.1	4.2	3.0	3.1	2.0	2.0	1.8	1.4	2.1	2.6	2.7	2.5
Total	10.1	25.0	19.8	3.8	18.2	5.7	15.2	5.1	6.3	9.8	6.6	29.9	12.9
Second period--													
Camping <sup>2</sup>	34.1	36.9	32.3	23.0	31.4	22.9	30.8	26.1	15.7	25.7	22.3	26.6	27.3
Day <sup>3</sup>	3.9	2.8	2.0	1.5	2.7	2.5	1.7	1.8	1.8	2.4	2.2	1.8	2.2
Total	12.1	28.6	18.8	6.8	23.0	8.3	23.6	9.1	5.7	16.5	5.8	21.7	15.0
OFF-UNIT USE <sup>6</sup> (No.):													
First period--													
Cars	92	--	165	13	47	30	145	83	19	92	51	14	751
Origin:													
In-State	72	--	--	4	29	12	--	--	--	--	--	--	117
Out-State	16	--	--	8	9	17	--	--	--	--	--	--	50
Visitors	310	--	399	46	190	103	551	374	70	350	210	53	2,656
Visitor hours <sup>7</sup>	404	--	--	7	2,017	229	--	--	--	--	--	--	2,657
Second period--													
Cars	390	66	274	8	93	45	142	29	12	79	76	21	1,235
Origin:													
In-State	322	53	251	8	36	31	--	--	--	--	--	--	701
Out-State	22	8	11	0	45	11	--	--	--	--	--	--	97
Visitors	1,140	177	794	25	392	127	539	131	44	300	318	80	4,067
Visitor hours <sup>7</sup>	8,526	2,039	6,196	5	4,282	251	--	--	--	--	--	--	21,299
DAILY USE PER CAMPING VISITOR, ALL UNITS (Percent):													
First period--													
0- 6 hours	74	27	54	100	64	71	54	84	100	74	80	50	62
7-12 hours	21	31	24	0	18	23	36	16	0	24	15	26	23
13-18 hours	5	16	2	0	9	6	5	0	0	2	5	4	5
19-24 hours	0	26	20	0	9	0	5	0	0	0	0	20	10
Second period--													
0- 6 hours	33	31	60	100	18	53	38	63	86	56	84	91	57
7-12 hours	27	20	22	0	68	35	40	32	7	38	16	7	25
13-18 hours	24	8	6	0	9	6	11	0	0	2	0	2	8
19-24 hours	16	41	12	0	5	6	11	5	7	4	0	0	10
DAILY USE PER VISITOR, PER UNIT (Hours):													
First period--													
Camping <sup>2</sup>	4.9	12.2	8.2	0.3	6.7	4.5	6.9	3.2	4.0	4.4	2.8	9.5	5.6
Day-use <sup>3</sup>	.7	.2	.4	.4	.4	.6	.3	.3	.4	.4	.3	.1	.4
Total	5.6	12.4	8.6	.7	7.1	5.1	7.2	3.5	4.4	4.8	3.1	9.6	6.0
Second period--													
Camping <sup>2</sup>	11.3	13.8	6.5	.25	9.2	6.8	9.4	6.7	5.1	7.0	2.8	1.3	6.4
Day-use <sup>3</sup>	.7	.2	.1	.05	.4	.4	.2	.4	.4	.4	.4	0	.3
Total	12.0	14.0	6.6	.3	9.6	7.2	9.6	7.1	5.5	7.4	3.2	1.3	7.0

<sup>6</sup>Those who entered a campground but did not use a designated family unit; includes camping, day use, driving in and out.<sup>7</sup>Excludes time driving in and out.

Camping parties outnumbered day-use parties by a very narrow margin (1.1 to 1.0). The individual campgrounds show a wide variation between camping and day-use parties, and between in- and out-State parties for the two periods.

The significance of these differences appears to lie in the distance the campgrounds are from major population centers, proximity of principal travel routes, and presence of outstanding points of interest. For example, the high proportion of in-State day-users at Rose Canyon, Fourth of July, Echo Lake, and Mirror Lake campgrounds reflects their closeness to Tucson, Arizona, Albuquerque, New Mexico, Denver, Colorado, and Laramie, Wyoming; the high ratio of out-State camping and day-use parties at Walton Creek and La Sombra-Capulín campgrounds reflects their proximity to major travel routes--U. S. Highways 40 and 64. The high number of both in- and out-State camping parties at Holy Ghost, Maroon Lake, and Sheridan Point campgrounds indicates interest in major points of interest such as the Pecos Wilderness Area, the Maroon Bells-Snowmass Wild Area, and Mount Rushmore in the Black Hills. The high proportion of in-State camping and day-users at Lakeside, Ashurst, and Chambers Lake campgrounds reflects interest primarily in fishing and boating.

#### Camping Equipment

As expected, the major unit of transportation was the automobile (table 2,b). Less than 10 percent of the total vehicles consisted of campers (pickup with camper-back, fig. 7, or other sleep-in vehicle). The use of tents (fig. 8) for camping exceeded travel trailers (fig. 9) by a ratio of 1.5 to 1. The number of boat trailers at family units was small since most of them were stored at boat launching areas. Bedrolls, without other cover, were common and were used mainly by organized groups in transit.

#### Number of Vehicles

A significant finding was the number of vehicles driven to units at individual camp-

grounds during the two 4-day observational periods (table 2,c). The higher the average number of vehicles per unit the greater the pressure of vehicular use at the campground. One vehicle daily per unit or four for a period would be the normal expectation.

#### Number of Visitors

The average number of visitors per party (table 2,d) is generally greater than the average number of visitors per vehicle (cars plus campers, table 2,e) because frequently two or more vehicles are used by a single party. Both visitors per party and visitors per vehicle vary from one campground to another, and from one period to the next. Camping visitors per party and per vehicle are less in number than day-use visitors per party and per vehicle.

#### Age Classes

The age classes of visitors <sup>5</sup> for all campgrounds studied during both observational periods followed a consistent pattern:

Period of observation and age of visitors	Camp	Day	Total
	(percent)		
First period:			
13 yrs. or less	36	29	33
14-20 yrs.	10	13	11
21-39 yrs.	30	36	33
40-59 yrs.	20	19	19
60+ yrs.	4	3	4
Second period:			
13 yrs. or less	35	34	34
14-20 yrs.	9	8	8
21-39 yrs.	33	35	34
40-59 yrs.	21	20	21
60+ yrs.	2	3	3

The young adult (21-39 years) and children (13 years or less) were the dominant visitors. Next in importance was the middle-aged adult (40-59 years) followed by the teenager (14-20 years). The older adult (60+ years) was the most infrequent visitor.

<sup>5</sup> Since age of visitors was estimated, there is an inherent error in the data.



Figure 7.--Campers are used by 3 out of 20 visitors who camp. This unit at Lakeside campground received high use. Sitgreaves National Forest, Arizona.



Figure 8.--Tents are popular with 4 out of 10 visitors who camp. Holy Ghost campground, Santa Fe National Forest, New Mexico.



Figure 9.--Travel trailers are used by 3 out of 10 visitors who camp. This unit at Lakeside campground also received high use. Sitgreaves National Forest, Arizona.







Figure 10.--Off-unit use access road at Echo Lake campground; unit table right. Arapaho National Forest, Colorado.

The young adults and children together often consisted of a party of 3 to 5, but just as often groups of 25 or more children under the supervision of 2 to 4 young adults visited the campgrounds. Members of the Boy Scouts, Girl Scouts, Future Farmers of America, 4-H, Dude Ranch, and church organizations made up these groups.

The same general age-class pattern held for the individual campgrounds with regard to camping (table 2,f) and day-use (table 2,g).

Relief from desert heat and good fishing opportunities tended to attract a larger proportion of middle-aged and older adults, both for camping and day-use, to the Lakeside and Ashurst campgrounds than to the others studied in Arizona and New Mexico. Likewise, the scenic attractions and good fishing at Mirror Lake campground in Wyoming attracted a greater number of this group for camping and day-use. The middle-aged and older adults constituted a larger proportion of the day-users at Maroon Lake and Walton Creek campgrounds than at the other campgrounds in Colorado and South Dakota. The scenic attractions nearby, as well as convenience for noon-day stops, may account for the greater visits by this group.

The sex ratio of visitors for both periods to all campgrounds was 51.5 percent males, 48.5 percent females. These data suggest a

higher participation by females in summer forest recreation than previously suspected.

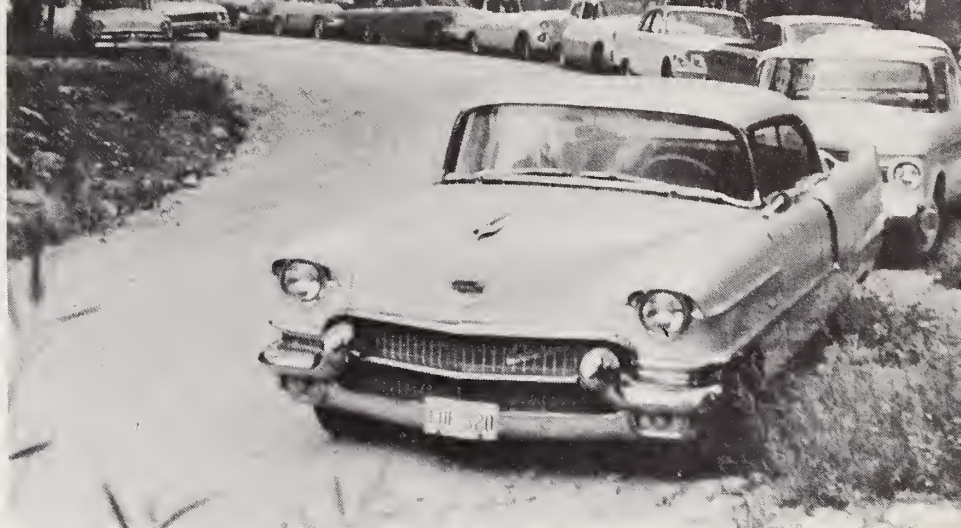
#### Visitor-hour Use

Visitor-hour use--the basic unit in measuring use of recreation facilities--is the product of the number of visitors times the hours they occupied a family unit. A visitor to a unit was counted only once during his stay. Most visitor-hour use was attributed to camping and not day-use (table 2,h). An exception was the Fourth of July campground, which received more visitor-hour use in the first period through day-use than through camping. In general, day-use was only about 10 percent of the visitor-hour use at the campgrounds.

Previous discussion has indicated that the use of the 12 campgrounds reflects the distance they are from major population centers, the proximity of travel routes, and points of interest. The average daily visitor-hour use per unit at each campground is a measure of this use. Had the average party of 4.8 visitors (table 2,d) used a unit for 24 hours, the visitor-hour use would be 115. Using this as a base, units at the campgrounds were used on the average of 38 percent during the first period and 46 percent during the second. Only in the cases of Rose Canyon over Labor Day weekend, and Holy Ghost where large groups stayed longer in the second period were the



Figure 11.--Parking along access roads caused traffic congestion such as this at Rose Canyon campground. Coronado National Forest, Arizona.



units used near the maximum. Of particular interest is the lack of use at Fourth of July campground, and the almost nonuse of Sheridan Point campground after Labor Day.

### Length of Stay

Length of stay (table 2,i) is expressed in hours per visitor, and is obtained by dividing total visitor hours at all units by total visitors. Hours of stay per visitor corrects for the varying numbers of parties and visitors per party.

The length of stay per visitor at each of the campgrounds was variable, particularly for camping. It was somewhat more uniform for day-users. If all visitors to a campground had stayed through the full observation period, then the length of stay per visitor would have been 81 hours. As it was, all visitors averaged only 13 to 15 hours per person during an observational period. For both camping and day-use, the time spent per visitor at a campground was short.

### Off-unit Use

Off-unit use (table 2,j) includes camping and day-use at the campground but not at designated family units (fig. 10). It also includes driving in and out--a visit of less than 15 minutes' duration.

The magnitude of off-unit use may be attributed to several interacting factors: fishing opportunities at Rose Canyon, Ashurst, and Chambers Lake campgrounds; scenic attrac-

tions at Maroon Lake and Mirror Lake campgrounds; establishment of organization camps at the Holy Ghost campground; or the desire to see "what's going on" as in the case of the Lakeside and La Sombra-Capulin campgrounds.

The cars of off-unit users place an additional burden on access roads, disturb family-unit users by creating dust palls, and cause hazardous traffic congestions (fig. 11).

### Daily Use of Family Units

"Average hours of daily use per visitor" may range from 0 to 24, as defined on page 10. This term was devised to measure intensity of use of the units within a campground. Throughout the 12 campgrounds observed, intensity of use was not uniform (table 2,k). For example, over the two 4-day periods, 60 percent of the units averaged less than 6 hours of daily use per camping visitor. Day-use of units did not exceed 6 hours (table 2,i); thus, all units receiving day-use alone were used less than 6 hours per visitor.

Certain campgrounds, notably Rose Canyon (second period), and Lakeside, Ashurst, Maroon Lake, and Sheridan Point (first period) had several family units that received up to 24 hours' use per day per camping visitor (fig. 12). All of the units at Fourth of July and Walton Creek (first period) campgrounds were used 6 hours or less per day per camping visitor (table 2,k). Some of the factors associated with this apparent disparity of unit use will be discussed in a later section.



Table 3. --Choice of family units by incoming new parties<sup>1</sup> to 12 campgrounds in 5 States for two 4-day periods, 1962

Choice of units	Arizona			New Mexico			Colorado				Wyo- ming	South Dakota	Total or average
	Rose Can- yon	Lake- side	Ashurst	Fourth of July	Holy Ghost	La Sombra- Capulin	Maroon Lake	Echo Lake	Walton Creek	Cham- bers Lake	Mirror Lake	Sheri- dan Point	
FAMILY UNITS (No.)	<sup>2</sup> 85	51	50	26	22	17	61	19	14	55	19	96	514

## [a] UNITS SELECTED (No. of units):

## First period --

## No. of new parties:

0	10	16	18	10	3	1	12	2	0	14	10	40	136
1-2	38	19	21	15	14	4	25	5	0	19	3	40	203
3-4	26	14	11	1	4	7	19	5	3	14	5	15	124
5-6	9	1	0	0	1	3	4	2	4	7	0	1	32
7+	1	1	0	0	0	2	1	5	7	1	1	0	19

## Second period --

## No. of new parties:

0	11	23	26	22	2	4	12	0	1	3	6	84	194
1-2	29	18	17	4	10	4	33	5	6	23	6	12	167
3-4	24	6	7	0	9	4	12	5	1	25	2	0	95
5-6	14	3	0	0	1	3	4	3	3	4	3	0	38
7+	6	1	0	0	0	2	0	6	3	0	2	0	20

## [b] UNITS NOT SELECTED (No. of units):

## First period --

Constantly used<sup>3</sup>

0	13	10	0	2	0	3	0	0	0	0	0	20	48
---	----	----	---	---	---	---	---	---	---	---	---	----	----

Never used	10	3	8	10	1	1	9	2	0	14	10	20	88
------------	----	---	---	----	---	---	---	---	---	----	----	----	----

Not selected	10	16	18	10	3	1	12	2	0	14	10	40	136
--------------	----	----	----	----	---	---	----	---	---	----	----	----	-----

## Second period --

Constantly used<sup>3</sup>

<sup>4</sup> 11	21	6	0	1	1	7	<sup>5</sup> 0	1	2	0	0	0	50
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Never used	0	2	20	22	1	3	5	0	0	1	6	84	144
------------	---	---	----	----	---	---	---	---	---	---	---	----	-----

Not selected	11	23	26	22	2	4	12	0	1	3	6	84	194
--------------	----	----	----	----	---	---	----	---	---	---	---	----	-----

<sup>1</sup> Those that actually came to a campground during the observational periods, in addition to parties present when period began.<sup>2</sup> Only 84 units in compiled data; records incomplete for one unit.<sup>3</sup> Units used 19 to 24 hours.<sup>4</sup> Two units not used full 24 hours; they were selected by incoming new parties.<sup>5</sup> One unit not used full 24 hours; it was selected by incoming new party.

In general, the average daily use per visitor per family unit for both camping and day-use averaged 6 hours the first period and 7 the second (table 2,m). The average daily use per day-use visitor at each family unit was brief--from 0.3 to 0.4 hour (20-25 minutes). With the exception of the Fourth of July campground (first period), the bulk of the average hours of daily use per visitor at each unit was contributed by visitors who camped.

## Incoming New Parties

Incoming new parties--those that actually came to a campground during the observational periods, in addition to those parties al-

ready present when the period began--were recorded and identified with the family units they selected for use (table 3). The number of incoming new parties selecting a particular family unit was used as a measure of the popularity of that unit, provided that it was not continuously occupied.

Ten percent of the family units were used between 19 and 24 hours (table 2,k). This percentage influenced the number of family units available to be chosen by new parties (table 3,a). Some units could not be chosen because they were in constant use; others were never selected although available (table 3,b). In the first period 17 percent of the 514 family units were never used; 28 percent were never used



pure 12.--This unit at Maroon Lake campground, designed for both camping and day-use, was used constantly during a 4-day observational period. White River National Forest, Colorado.



Figure 13.--This unit restricted to day-use at Maroon Lake campground was never used during either period. Its companion (background) was used for both camping and day-use. White River National Forest, Colorado.

in the second period (fig. 13). The scope of the present study did not provide for personal interviews with visitors; reasons why some units were not selected are probably related to the associated factors which follow.

More important is the observation that a limited number of family units are selected by several new parties (fig. 14). For example, in the first period, 10 percent of the total family units (514) were selected by 5 or more incoming new parties; this percentage was about the same (11 percent) during the second period.

It would appear that the parties visiting the campgrounds could have been accommodated by about 20 percent fewer family units, since these units were not selected for use during the two observational periods.

There is a rapid turnover of certain family units and not of others. This may be more

related to day-users whose visits are brief than to an undesirable camping environment.

#### Factors Associated with Use

Chi-square tests of probability were used (Snedecor, 1956) to identify factors that might be associated with the total hours of daily use per visitor at each family unit. Because of the individual campground differences with regard to number of family units, topography, distance from population centers, and opportunities for different recreational activities, it was decided to combine recreational use by periods for testing purposes. No tests were made of the presence or absence of such factors as shade or screening because the bulk of the family units at each campground were usually either one way or the other. Characteristics of each campground were inventoried, however, during the first period of observation (table 4,a). Dispersion of family



Table 4. --Physical characteristics of family units at each of 12 campgrounds in 5 States, inventoried or measured during first 4-day observation period, 1962

Inventory or measurement	Arizona			New Mexico			Colorado				Wyo-ming	South Dakota	Total or average
	Rose Canyon	Lake-side	Ashurst	Fourth of July	Holy Ghost	La Sombra-Capulín	Maroon Lake	Echo Lake	Walton Creek	Chambers Lake	Mirror Lake	Sheridan Point	

[a] CHARACTERISTICS INVENTORIED (No. of units):

Shade --													
Yes	66	50	50	14	17	13	48	13	10	49	8	86	424
No	18	1	0	12	5	4	13	6	4	6	11	10	90
Screened --													
Yes	40	0	1	5	5	10	13	10	0	8	1	0	93
No	44	51	49	21	17	7	48	9	14	47	18	96	421
Stony surface --													
Yes	8	1	49	0	7	0	5	0	0	9	16	0	95
No	76	50	1	26	15	17	56	19	14	46	3	96	419
Bare surface --													
Yes	80	16	12	11	11	11	0	3	0	3	2	0	149
No	4	35	38	15	11	6	61	16	14	52	17	96	365
Eroded surface --													
Yes	13	7	12	0	16	9	6	14	7	0	17	11	112
No	71	44	38	26	6	8	55	5	7	55	2	85	402
Reinforced --													
Yes	60	1	0	26	0	0	2	1	1	55	0	.5	151
No	24	50	50	0	22	17	59	18	13	0	19	91	363

[b] CLEARING RADIUS<sup>1</sup> (No. of units):

0- 5 feet	0	15	39	8	6	4	<sup>2</sup> 3( 1)	0	1	0	2	26	104
6-10 feet	0	13	6	12	3	3	20(11)	0	3	3	2	25	90
11-15 feet	7	14	2	2	5	3	26(21)	8	4	42	9	20	142
16-20 feet	40	4	3	4	5	3	4(12)	6	4	7	5	9	94
21-25 feet	21	4	0	0	2	2	2( 7)	2	2	3	1	6	45
26-30 feet	10	1	0	0	1	1	5( 6)	2	0	0	0	8	28
31-35 feet	1	0	0	0	0	1	0( 1)	1	0	0	0	0	3
36-40 feet	5	0	0	0	0	0	1( 2)	0	0	0	0	2	8

[b] DISTANCE FROM UNITS TO FACILITIES (No. of units):

Parking --													
0- 50 feet	46	51	47	11	21	17	47	13	14	55	17	96	435
51-100 feet	21	0	3	13	1	0	5	3	0	0	1	0	47
101-150 feet	6	0	0	2	0	0	1	1	0	0	1	0	11
151-200 feet	6	0	0	0	0	0	6	1	0	0	0	0	13
201+ feet	5	0	0	0	0	0	2	1	0	0	0	0	8
Toilet --													
0- 50 feet	1	14	1	0	0	10	4	3	4	8	0	22	67
51-100 feet	16	19	2	11	7	2	18	10	4	8	1	36	134
101-150 feet	12	9	1	10	3	5	5	2	5	9	4	16	81
151-200 feet	10	4	2	5	3	0	9	3	0	7	0	17	60
201+ feet	45	5	44	0	9	0	25	1	1	23	14	5	172
Trash container --													
0- 50 feet	84	48	35	25	19	13	47	19	12	55	3	90	450
51-100 feet	0	3	9	1	1	4	7	0	1	0	7	6	39
101-150 feet	0	0	3	0	1	0	2	0	1	0	3	0	10
151-200 feet	0	0	3	0	0	0	5	0	0	0	0	0	8
201+ feet	0	0	0	0	1	0	0	0	0	0	6	0	7
Drinking water --													
0- 50 feet	3	20	0	3	0	2	12	8	9	10	0	15	82
51-100 feet	6	19	0	7	0	1	20	3	4	17	0	30	107
101-150 feet	3	8	0	3	0	0	8	6	1	8	0	10	47
151-200 feet	5	4	0	3	0	0	11	2	0	11	0	7	43
201+ feet	67	0	50	10	22	14	10	0	0	9	19	34	235
Closest unit --													
0- 50 feet	1	46	32	20	2	8	5	3	5	5	7	42	176
51-100 feet	28	5	16	6	7	7	36	12	8	22	9	52	208
101-150 feet	22	0	2	0	2	2	15	4	1	25	2	1	76
151-200 feet	26	0	0	0	4	0	5	0	0	3	1	0	39
201+ feet	7	0	0	0	7	0	0	0	0	0	0	1	15
Fishing point --													
0- 50 feet	0	0	7	0	11	17	8	0	7	12	2	4	68
51-100 feet	0	0	4	0	4	0	1	0	4	3	1	12	29
101-150 feet	0	0	9	0	3	0	2	0	3	3	2	4	26
151-200 feet	0	0	8	0	2	0	3	0	0	4	0	5	22
201+ feet	84	51	22	26	2	0	47	19	0	33	14	71	369

<sup>1</sup> Based on maximum distance from fire grate to edge of disturbed area created by trampling or other activities that tended to destroy the ground cover.

<sup>2</sup> Numbers in parentheses indicate remeasurement during the second observation period; not included in total.





*Figure 14.--This unit at Chambers Lake campground was selected by five or more incoming new parties during a 4-day observation period. Roosevelt National Forest, Colorado.*

units was usually found according to the distance they were from parking, toilets, drinking water, closest unit, fishing point, and size of clearing. Those campgrounds with units sufficiently dispersed were then combined to test the total hours of daily use per visitor at each unit against distances to facilities (table 4,b). The tests indicate the following:

1. In the first period, family units within 100 feet of toilets were preferred over those located over 100 feet. In the second period, units within 50 feet of toilets were least preferred and those over 200 feet most preferred.
2. In the first period, family units within 150 feet of drinking water were used longer than those located over 150 feet. The same condition prevailed during the second period except the distance increased to 200 feet.
3. There was a tendency in the first period for family units located more than 150 feet apart to be used longer than those located closer together. In the second period, units

closer than 100 feet were used less than those farther apart. (fig. 15).

4. In the first period, family units located from 50 to 200 feet from a fishing point were used longer than units located less than 50 feet or more than 200 feet. In the second period, family units less than 50 feet or between 100 and 150 feet from a fishing point were used longer than those located at other distances.
5. Family units with a clearing more than 20 feet in radius were used longer in the first period than those under 20 feet. In the second, those units with a clearing over 10 feet in radius were used longer than the units with less (fig. 16).

Calculations for Chi-square tests are shown (table 5). A more thorough test of experimentally laid-out campgrounds is needed, however, to ascertain the true relation between total hours of daily use per visitor at each unit and such factors as parking, toilets, drinking water, and size of clearing.





*Figure 15.--Family units closer together than 100 feet are not used so long as those farther apart. Fourth of July campground. Cibola National Forest, New Mexico.*

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*Figure 16.--Family units with a clearing over 10 feet in radius, such as this one at Sheridan Point campground, are used more than units with a smaller clearing. Black Hills National Forest, South Dakota.*

Table 5. --Calculations of Chi-square tests of probability -- expected and observed use refer to "total hours of daily use per visitor at each family unit"

Distance and observation period	Number of units	Percent units	Expected use (E)	Observed use (O)	O - E	(O - E) <sup>2</sup>	$\frac{(O - E)^2}{E}$
<b>TO TOILETS:</b>							
First period--							
0- 50 feet	66	14.8	461.1	526.1	65.0	4,255.0	9.16
51-100 feet	131	29.4	916.0	998.6	82.6	6,822.76	7.45
101-150 feet	76	17.1	532.9	459.9	-73.0	5,329.0	10.0
151-200 feet	58	13.1	408.2	451.2	43.0	1,849.0	4.53
201+ feet	114	25.6	797.6	680.0	-117.6	13,829.76	17.34
Total	445	100.0	3,115.8	3,115.8	0		48.48 = $\chi^2$ **
Second period--							
0- 50 feet	66	14.8	502.5	437.7	-64.8	4,199.04	8.36
51-100 feet	131	29.4	998.2	1,002.7	4.5	20.25	--
101-150 feet	76	17.1	580.6	522.3	-58.3	3,398.89	5.85
151-200 feet	58	13.1	444.8	443.4	-1.4	1.96	--
201+ feet	114	25.6	869.2	989.2	120.0	14,400	16.57
Total	445	100.0	3,395.3	3,395.3	0		30.78 = $\chi^2$ **
<b>TO DRINKING WATER:</b>							
First period--							
0- 50 feet	68	22.1	517.0	589.8	72.8	5,299.84	10.25
51-100 feet	96	31.2	729.9	816.7	86.8	7,534.24	10.32
101-150 feet	43	14.0	327.5	363.7	36.2	1,310.44	4.00
151-200 feet	38	12.3	287.7	214.8	-72.9	5,314.41	18.47
201+ feet	63	20.4	477.2	354.3	-122.9	15,104.41	31.65
Total	308	100.0	2,339.3	2,339.3	0		74.69 = $\chi^2$ **
Second period--							
0- 50 feet	68	22.1	437.2	503.8	66.6	4,435.56	10.14
51-100 feet	96	31.2	617.2	639.8	22.6	510.76	.83
101-150 feet	43	14.0	277.0	327.5	50.5	2,550.25	9.21
151-200 feet	38	12.3	243.3	289.1	45.8	2,097.64	8.62
201+ feet	63	20.4	403.6	218.1	-185.5	34,410.25	85.26
Total	308	100.0	1,978.3	1,978.3	0		114.06 = $\chi^2$ **
<b>TO CLOSEST UNIT:</b>							
First period--							
0- 50 feet	28	10.9	160.8	146.3	-14.5	210.25	1.31
51-100 feet	107	41.6	613.9	594.4	-19.5	380.25	.62
101-150 feet	68	26.5	391.1	385.9	- 5.2	27.04	.07
151-200+ feet	54	21.0	309.9	349.1	39.2	1,536.64	4.96
Total	257	100.0	1,475.7	1,475.7	0		6.96 = $\chi^2$ *
Second period--							
0- 50 feet	28	10.9	261.3	132.6	-128.7	16,563.69	63.39
51-100 feet	107	41.6	997.2	982.2	-15.0	225.00	.22
101-150 feet	68	26.5	635.3	655.6	20.3	412.09	.65
151-200+ feet	54	21.0	503.4	626.8	123.4	15,227.56	30.25
Total	257	100.0	2,397.2	2,397.2	0		94.81 = $\chi^2$ **
<b>TO FISHING POINT:</b>							
First period--							
0- 50 feet	48	16.2	368.5	330.1	-38.4	1,474.56	4.00
51-100 feet	28	9.4	213.8	278.7	64.9	4,212.01	19.70
101-150 feet	24	8.1	184.3	207.5	23.2	538.24	2.92
151-200 feet	22	7.4	168.4	223.5	55.1	3,036.01	18.03
201+ feet	175	58.9	1,339.9	1,235.1	-104.8	10,983.04	8.20
Total	297	100.0	2,274.9	2,274.9	0		52.85 = $\chi^2$ **
Second period--							
0- 50 feet	48	16.2	281.6	336.1	54.5	2,970.25	10.55
51-100 feet	28	9.4	163.5	116.2	-47.3	2,237.29	13.68
101-150 feet	24	8.1	140.8	162.1	21.3	453.69	3.22
151-200 feet	22	7.4	128.6	127.8	-.8	6.4	.05
201+ feet	175	58.9	1,023.9	996.2	-27.7	767.29	.75
Total	297	100.0	1,738.4	1,738.4	0		28.25 = $\chi^2$ **
<b>CLEARING RADIUS:<sup>1</sup></b>							
First period--							
0- 5 feet	65	15.9	462.9	469.8	6.9	47.61	0.10
6-10 feet	81	19.8	576.5	623.9	47.4	2,246.76	3.90
11-15 feet	98	24.0	698.8	662.8	-36.0	1,296.0	1.85
16-20 feet	84	20.5	596.9	472.6	-124.3	15,450.49	25.88
21-25 feet	42	10.3	299.9	340.5	40.6	1,648.36	5.50
26-30+ feet	39	9.5	276.6	342.0	65.4	4,277.16	15.46
Total	409	100.0	2,911.6	2,911.6	0		52.69 = $\chi^2$ **
Second period--							
0- 5 feet	65	15.9	484.5	269.7	-214.8	46,139.04	95.23
6-10 feet	81	19.8	603.4	334.1	-269.3	72,522.49	120.19
11-15 feet	98	24.0	731.3	773.8	42.5	1,806.25	2.47
16-20 feet	84	20.5	624.6	764.4	139.8	19,544.04	31.29
21-25 feet	42	10.3	313.8	492.6	178.8	31,969.44	101.88
26-30+ feet	39	9.5	289.5	412.5	123.0	15,129.0	52.26
Total	409	100.0	3,047.1	3,047.1	0		403.32 = $\chi^2$ **

\*\* Significant at 1 percent.

\* Significant at 6 percent.

<sup>1</sup> Based on maximum distance from fire grate to edge of disturbed area created by trampling or other activities that tended to destroy the ground cover.





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1964. Summer recreational use of selected National Forest campgrounds in the central Rocky Mountains. U. S. Forest Serv. Res. Paper RM-5, 16 pp., illus. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.

Use of 12 existing recreation sites by summer recreationists for camping and day-use was explored. Factors associated with the choice of family units appear to be distances from toilets, drinking water, fishing point, and other units, as well as the size of the clearing at the unit.

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